

Irish Wetland Bird Survey: Results of Waterbird Monitoring in Ireland in 2001/02

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The Irish Wetland Bird Survey (I-WeBS) is the principal tool for monitoring wintering waterfowl populations and their wetlands in the Republic of Ireland. It has been in operation since 1994/95. This paper summarises the results of the eighth (2001/02) season. A total of 323 sites were covered at least once during the season. Coverage was widespread, and was greatest in January, when 96% of sites were counted. A total of 94 waterbird species were recorded, and a peak count of almost 465,000 was made in January. However, lack of January coverage of a few important waterfowl sites meant that peaks for some species were recorded in other months. Trend analyses were carried out on 28 species, and indicated that numbers of the majority of species have been in decline during the course of I-WeBS. There were increases in just 8 species, declines in 14, while 6 remained stable. The most substantial increases included Mute Swan *Cygnus olor*, Gadwall *Anas strepera*, Oystercatcher *Haematopus ostralegus*, Bar-tailed Godwit *Limosa lapponica*, while there were substantial declines in Pintail *Anas acuta*, Coot *Fulica atra* and Knot *Calidris canutus*. In total, there were 13 species that occurred in internationally important numbers and a further 40 nationally important at one or more sites. A total of 48 internationally important and 98 nationally important sites were identified, with Dundalk Bay, the Shannon and Fergus Estuary and Wexford Harbour and Slobs supporting the greatest numbers overall.

Introduction

Ireland supports a high diversity and large numbers of high latitude-nesting waterfowl during the non-breeding season. Located at the southern edge of the major flyways of many species, its mild climate ensures that feeding is rarely interrupted by freezing conditions. Some species migrate here, while others use Ireland as a

stopover site, while en route to more southerly wintering areas. We thus have an obligation to protect and conserve these species and the habitats they depend on, so that together with other countries along the various flyways, their populations are maintained. These interna-

tional responsibilities are recognised through the Irish government's ratification in a number of conventions and agreements, including the Ramsar Convention, the EU Birds and Habitats Directives, the Convention on Biological Diversity and, since 1999, the African-Eurasian Migratory Waterbirds Agreement (AEWA) of the Bonn Convention.

Some or all of the waterbird populations wintering in Ireland have been monitored since the 1960s. The first thorough and coordinated survey took place over three successive seasons since 1971/72 (Hutchinson 1979). This survey was repeated 11 years later, between 1984/85 and 1986/87 (Sheppard 1993). There were considerable differences in the status of many wetland sites and many species over that 11 year period, and these surveys highlighted the requirement for further monitoring, particularly with many of these wetlands becoming threatened by development since the 1980s.

The Irish Wetland Bird Survey (I-WeBS) was initiated in 1994/95. It has been in operation since, and continues to be the primary tool used for monitoring populations of non-breeding waterfowl in the Republic of Ireland. It also aims to quantify the importance of wetlands, so that these can be adequately protected and managed where necessary. I-WeBS parallels the Wetland Bird Survey (WeBS) in Britain and Northern Ireland, and aims to identify long-term trends in population size and distribution of wintering waterbirds in Ireland. Results are regularly published in annual reports, newsletters or published papers (e.g. Colhoun 2002, 2001a & 2001b). I-WeBS also encompasses a number of extra species-specific surveys targeted at those species which do not necessarily spend all their time on wetlands, and which are thus overlooked (e.g. migratory swan survey every five years, see Colhoun et al. (2000)). It includes surveys aimed at quantifying the population using non-estuarine coast (Colhoun and Newton 2000), a habitat that is not regularly monitored during I-WeBS counts. This paper aims to present the results of the eighth I-WeBS season, 2001/02.

Methods

Field methods and scheme organisation

I-WeBS uses the well-established technique of counting the numbers of waterbirds at wetland sites by the 'look-see' method (Bibby et al 1992). This involves counters recording the number of individuals of a number of waterbird species on frequent visits to pre-defined discrete wetland sites. This method is internationally recognised as the most appropriate way of collating data

on waterbird numbers using a given site. All species within the families Gaviidae (divers), Podicipedidae (grebes), Ardeidae (herons and egrets) Anatidae, (swans, geese and ducks), Rallidae (Water Rail, Moorhen and Coot), Haematopodidae (oystercatchers), Charadriidae (plovers, lapwings), Scolopacidae (sandpipers, curlews, woodcocks, phalaropes), Laridae (gulls and terns, excluding Kittiwake *Rissa tridactyla*), and also Cormorant *Phalacrocorax carbo*, and Kingfisher *Alcedo atthis* are counted. Counts of gulls and terns are optional. The scientific names of all species mentioned in the text are presented in Table 1.

Certain groups of species are not sufficiently monitored using this technique. This is due primarily to their behaviour and ecology, and include species such as inland feeding waders (e.g. Curlew, Golden Plover and Lapwing) which occur well beyond discrete wetland sites, species which occur on the open sea (e.g. divers and seaduck) counts of which are constrained by sea and viewing conditions, and skulking species such as Snipe (Colhoun 2001a).

Counts are requested to be carried out once per month between September and March. The organisation and administration of the scheme are carried out at the I-WeBS Office with help on a local basis from regional organisers. The counts are undertaken by skilled amateur ornithologists and professional staff of the National Parks and Wildlife Service. The widespread nature and scale of some of the sites is so great that few sites can be counted in all months. Counters are encouraged to undertake counts in January (coincident with the International Waterbird Census) and as many months as possible on either side. The dates chosen for counting are pre-determined so as to minimise duplication in counting across the entire country. Where possible, dates on mid-month weekends with high tides around midday were selected, enabling counting in the hours immediately preceding and following high tides. However, there is flexibility to account for local conditions such as counter availability and weather conditions. Due to the week lag in tidal regime between the east and west coast of Ireland, the count weekend for the south and west coasts are scheduled for one week later than those for the east and midlands. The count dates selected for the 2001/02 season (east and midlands) were 15th September, 6th October, 10th November, 15th December, 12th January, 9th February and 9th March.

Interpretation of results

For the assessment of the individual species populations, total numbers were derived from summed 'core counts' across all sites counted in each month, and on dates as

near as possible to the priority dates. These totals exclude other counts (duplicates) made at a number of sites in the same month. However, for the assessment of the importance of individual sites, the peak count of each species at each site and in each season, irrespective of month and whether a core or duplicate count, was used. Total waterfowl numbers at each site were calculated by summing the species peaks in each season, and a mean count was based on the average of the most recent five-season period. Partial or incomplete counts were excluded from the calculation of the mean. A site was deemed to be stable if the 2001/02 total was within 10% of the mean calculated over the first five I-WeBS seasons (1994/95 – 1998/99), and was classified as internationally important if it regularly supported in excess of 20,000 waterfowl, and/or if it supported at least 1% of the flyway population of any waterfowl species and nationally important if it supported in excess of 1% of the all-Ireland population. The international and national population estimates are from Rose and Scott (1997) and Colhoun (2001a).

Trend analyses

Waterbird totals cannot be used to determine long-term trends in populations because the same I-WeBS sites are not necessarily covered in all seasons. Indexing techniques are typically used to allow comparisons between years. The Underhill Index was specifically developed to monitor changes in waterbird populations (Underhill and Prys-Jones 1994). This technique provides an estimate for missing counts at a site in a given month of a season based on other counts at that site in other months and seasons. Therefore, counts are comparable between years, and changes are calculated and the difference expressed as an index.

Several species are excluded from this procedure. Most swan and goose species are excluded due to their widespread occurrence on non-wetland habitat. Further, most of these populations are accurately monitored using special surveys, where it is assumed that the entire population is estimated. Similarly, Golden Plover and Lapwing are excluded due to their reliance on non-wetland (agricultural) habitat, as are Snipe and Jack Snipe due to their elusive nature. Other groups not monitored effectively through I-WeBS and excluded from the above analyses include divers and seaducks, gulls and terns (not regularly recorded, and/or occasionally flocks are too distant to count).

Index numbers based on counts from one single month only may not accurately reflect the status of a given population. For several species, there is more than one population that occurs in Ireland during the winter.

Many wader populations in particular occur on passage during the autumn and/or the spring, while another population may be present during the mid-winter period. As it is this latter group that is of primary interest to I-WeBS, only months between November and February inclusive were included in the analyses of wader populations. As the behaviour of wildfowl species is quite different, month selections were made for each species. Selection of the most appropriate months was made by firstly selecting the highest monthly value, and thereafter by including all other months with overlapping 90% consistency intervals. The index value was constrained to equal 100 at the most recent season (2001/02).

Results

Weather

The 2001/02 season was generally quite mild and bright, with temperatures and sunshine levels above normal throughout. September brought a dry start to the season, with rain occurring only in the final week of the month. Thereafter, rainfall totals overall were below normal, particularly in December and March, though October was relatively wet, and rain occurred almost every day from mid-January until the end of February. December was the coldest month, and there was widespread and severe frost in places, and snow showers in northern parts of the country during the last week of the month. This cold spell continued into the first week in January, while the weather throughout the remainder of the month was much milder, with just a short period of widespread frost in mid-February (Met Éireann).

Coverage

Widespread coverage was achieved in 2001/02 (Fig. 1), and all major coastal estuaries and inland lakes were counted at least once during the season. In total, 323 sites and 810 subsites were covered, including 58 estuarine sites, 167 lakes/lake complexes and 63 river sites. There were a further 24 coastal sites (non-estuarine), 4 reservoirs, 2 quarries, 2 coastal marshes and 3 swan sites (mostly grassland).

Overall, 61 sites were at least partially covered in all seven months, while there were 99 sites that were covered on just one occasion (Fig. 2). Maximum coverage was achieved in January, when 96% of sites were counted. However, this excludes some of the more important sites such as Lough Corrib, the Shannon and Fergus Estuary, the Shannon Callows and Little Brosna Callows, but these sites were covered during other



Fig 1. Locations of subsites covered during I-WeBS in 2001/02.

months, particularly in November and/or February. In all other months between September and March, coverage remained between 65% and 86%. Significant wetlands for which no data from the 2001/02 season were received include River Foyle, Donegal Bay, Sligo Harbour, Ballysadare Bay, the Southern Roscommon Lakes and the Barrow Estuary.

The majority of counts were ground-based. However, an aerial survey of the Shannon and Fergus Estuary, Loughs Derg and Ree and the Rivers Shannon, Brosna and Suck Callows was carried out on 6th February.

Total numbers

In total, 93 species, comprising 48 wildfowl and allies, 29 waders, 11 gull, 5 tern species and Kingfisher were recorded (Table 1). A peak waterbird count of almost 465,000 was recorded in January, and included 291,096 waders and 135,260 wildfowl (Table 1).

Peak counts of most species were made in January. Notable exceptions include Little Grebe, Pochard, Tufted Duck, Coot, Oystercatcher and Knot, all of which peaked

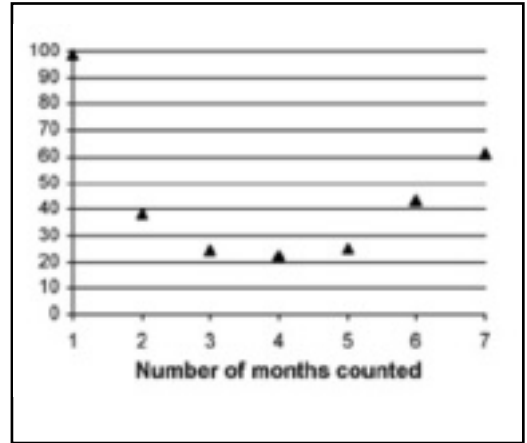


Fig. 2. Frequency of coverage in 2001/02.

in either November or February. Counts of most species declined since the first 5-season mean (1994/95 to 1998/99). Peaks of all swan species, Greenland White-fronted Goose and Barnacle Goose appeared to decline. However, these species are generally under-recorded during I-WeBS core-counts, and their populations are better assessed using special species surveys (see Colhoun et al. 2000, Merne and Walsh 2003). Tufted Duck and Pochard were the only ducks, and Ringed Plover, Ruff and Black-tailed Godwit the only wader species whose peak counts were larger. The peak counts of Little Egret and Mediterranean Gull were also higher, reflecting the continued expansion in ranges of both of these species in recent years.

Trend analyses were carried out on a total of 28 waterfowl species. Caution is urged in the interpretation of these trends due to the relative short time span of the project and due to the exclusion of data from sites in Northern Ireland. Nonetheless, increases were evident in eight species, declines in 14, while the populations of the remaining six species appeared relatively stable (Table 2). There were substantial increases in Mute Swan, Gadwall, Oystercatcher and Bar-tailed Godwit, and declines in Grey Heron, Pintail, Coot and Knot.

In total, internationally important concentrations of 13 species and nationally important of 40 species occurred at one or more sites in 2001/02 (Table 3). Internationally important numbers of Light-bellied Brent Goose, Whooper Swan and Black-tailed Godwit, and nationally important numbers of Golden Plover, Ringed Plover, Sanderling, Teal and Shoveler were present at the greatest number of sites (Table 3).

Table 1. Total numbers of waterbirds counted during I-WeBS in the Republic of Ireland in 2001/02.

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
<i>No. sites</i>	211	228	263	262	310	278	247
<i>No. subsites</i>	459	497	594	549	740	632	565
Red-throated Diver <i>Gavia stellata</i>	3	23	165	65	111	70	66
Black-throated Diver <i>Gavia arctica</i>			4		21	1	63
Great Northern Diver <i>Gavia immer</i>	7	13	245	106	175	162	325
Little Grebe <i>Tachybaptus ruficollis</i>	338	323	545	389	455	240	276
Great Crested Grebe <i>Podiceps cristatus</i>	114	283	604	528	932	532	560
Slavonian Grebe <i>Podiceps auritus</i>			10	6	6	17	2
Black-necked Grebe <i>Podiceps nigricollis</i>				2	2	1	
Cormorant <i>Phalacrocorax carbo</i>	1,873	2,053	2,401	1,618	2,468	1,246	1,192
Grey Heron <i>Ardea cinerea</i>	511	452	844	615	538	293	330
Little Egret <i>Egretta garzetta</i>	174	95	113	79	61	74	46
Spoonbill <i>Platalea leucorodia</i>		1	1	1	1		
Mute Swan <i>Cygnus olor</i>	1,137	2,102	2,829	2,200	3,271	2,035	1,704
Black Swan <i>Cygnus atratus</i>		1	2	1	2	1	
Bewick's Swan <i>Cygnus columbianus</i>			12	32	188	73	62
Whooper Swan <i>Cygnus cygnus</i>		353	1,836	3,094	3,297	1,921	1,794
Pink-footed Goose <i>Anser brachyrhynchus</i>		1	12	1	36	14	
Greenland White-fronted Goose <i>Anser anser flavirostris</i>	142	6,881	1,172	8,386	7,389	273	
Greylag Goose <i>Anser anser</i>	197	706	1,612	3,731	3,672	1,894	1,701
Canada Goose <i>Branta canadensis</i>	68	33	103	180	252	210	3
Barnacle Goose <i>Branta leucopsis</i>	1	1		16	680	916	451
Dark-Bellied Brent Goose <i>Branta bernicla bernicla</i>				1			
Black Brant <i>Branta bernicla nigricans</i>					1		1
Light-bellied Brent Goose <i>Branta branta hrota</i>	4	800	6,383	14,201	14,325	10,204	9,359
Shelduck <i>Tadorna tadorna</i>	64	258	2,224	4,478	6,920	5,122	2,473
Wigeon <i>Anas penelope</i>	1,429	9,089	29,517	33,086	31,662	17,643	10,115
American Wigeon <i>Anas americana</i>		1				6	4
Gadwall <i>Anas strepera</i>	23	35	247	367	242	160	126
Teal <i>Anas crecca</i>	2,594	4,996	11,327	15,513	17,658	9,422	5,396
Green-winged Teal <i>Anas carolinensis</i>					1		
Mallard <i>Anas platyrhynchos</i>	5,893	8,478	9,834	9,407	11,012	5,252	2,588
Pintail <i>Anas acuta</i>	22	89	277	311	240	262	177
Garganey <i>Anas querquedula</i>					2		
Shoveler <i>Anas clypeata</i>	43	304	438	735	1,151	830	759
Pochard <i>Aythya ferina</i>	32	95	17,660	1,383	6,976	1,819	947
Ring-necked Duck <i>Aythya collaris</i>			1	1	1		1
Tufted Duck <i>Aythya fuligula</i>	638	1,278	11,446	4,156	9,213	3,061	3,018
Scaup <i>Anas marila</i>		81	208	160	259	77	59
Eider <i>Somateria mollissima</i>		1	1	1	127		
Long-tailed Duck <i>Clangula hyemalis</i>			2	4	7	8	8
Common Scoter <i>Melanitta nigra</i>	27	390	5,237	604	4,253	274	122
Goldeneye <i>Bucephala clangula</i>	1	35	556	702	1,652	978	476
Smew <i>Mergus albellus</i>				1	2	1	
Red-breasted Merganser <i>Mergus serrator</i>	177	300	714	662	702	530	591
Ruddy Duck <i>Oxyura jamaicensis</i>		1					
Coot <i>Fulica atra</i>	826	2,193	14,189	4,863	3,749	14,327	1,360
Moorhen <i>Gallinula chloropus</i>	378	332	576	386	465	377	362
Water Rail <i>Rallus aquaticus</i>	2	6	19	10	21	16	16
Total wildfowl	16,586	35,351	129,225	105,008	135,313	87,484	46,918

Oystercatcher <i>Haematopus ostralegus</i>	18,912	17,188	22,475	20,499	20,123	18,172	11,839
Ringed Plover <i>Charadrius hiaticula</i>	2,438	3,348	4,149	2,761	3,592	1,829	548
Golden Plover <i>Pluvialis apricaria</i>	1,281	40,293	71,450	60,394	88,083	56,219	17,440
Grey Plover <i>Pluvialis squatarola</i>	453	633	2,333	1,583	2,248	1,856	630
Lapwing <i>Vanellus vanellus</i>	1,352	14,230	39,985	36,105	84,811	23,874	846
Knot <i>Calidris canutus</i>	544	669	6,104	8,545	7,952	9,365	8,066
Sanderling <i>Calidris alba</i>	513	1,299	1,202	1,218	1,020	823	691
Semi-palmated Sandpiper <i>Calidris pusilla</i>	1	1					
Little Stint <i>Calidris minuta</i>	5	1	3		2		
Pectoral Sandpiper <i>Calidris melanotos</i>	2						
Curlew Sandpiper <i>Calidris ferruginea</i>	25	6					
Purple Sandpiper <i>Calidris maritima</i>	9	7	34	60	95	75	51
Dunlin <i>Calidris alpina</i>	3,146	10,675	27,173	32,881	40,414	32,778	11,232
Ruff <i>Philomachus pugnax</i>	65	9	12		8	13	8
Jack Snipe <i>Lymnocyptes minimus</i>		2	10	18	24	20	15
Snipe <i>Gallinago gallinago</i>	46	217	458	553	553	411	297
Long-billed Dowitcher <i>Limnodromus scolopaceus</i>			1				
Woodcock <i>Scolopax rusticola</i>		2		3	1	3	1
Black-tailed Godwit <i>Limosa limosa</i>	6,194	8,824	6,254	9,385	7,676	6,401	4,291
Bar-tailed Godwit <i>Limosa lapponica</i>	2,068	3,350	5,386	5,890	7,077	6,360	1,999
Whimbrel <i>Numenius phaeopus</i>	26	5	2			4	2
Curlew <i>Numenius arquata</i>	7,647	10,308	12,302	11,931	15,501	15,319	6,195
Spotted Redshank <i>Tringa erythropus</i>	4	8	6	3	6	1	8
Redshank <i>Tringa totanus</i>	8,281	8,720	8,544	7,903	10,045	8,392	7,333
Greenshank <i>Tringa nebularia</i>	388	316	278	271	292	240	193
Green Sandpiper <i>Tringa ochropus</i>	2	14	5	5	8	1	
Common Sandpiper <i>Actitis hypoleucos</i>	9	3	2	4	5		1
Turnstone <i>Arenaria interpres</i>	867	1,301	1,431	1,286	1,520	1,128	1,050
Grey Phalarope <i>Phalaropus fulicarius</i>		4					
Total waders	54,278	121,433	209,599	201,448	291,056	183,284	72,736
Total waterfowl	70,865	155,484	338,824	306,307	426,005	270,768	119,654
Unidentified gull species <i>Larus</i> sp.			246		2,123	83	
Mediterranean Gull <i>Larus melanocephalus</i>	12	8	1		5	3	1
Little Gull <i>Larus minutus</i>						40	8
Black-headed Gull <i>Larus ridibundus</i>	13,075	11,633	22,764	18,638	18,604	13,607	9,608
Ring-billed Gull <i>Larus delawarensis</i>	1			1	1	3	
Common Gull <i>Larus canus</i>	1,612	1,773	7,121	3,261	12,970	14,442	2,132
Lesser Black-backed Gull <i>Larus fuscus</i>	2,456	2,124	8,347	846	3,450	1,292	1,719
Herring Gull <i>Larus argentatus</i>	1,076	931	1,151	723	2,173	1,652	953
Yellow-legged Gull <i>Larus arg. Cachinnans michahellis</i>			1				
Iceland Gull <i>Larus glaucoides</i>					3	4	
Glaucous Gull <i>Larus hyperboreus</i>			1		2	7	6
Great Black-backed Gull <i>Larus marinus</i>	1,105	1,048	1,602	501	1,359	1,024	968
Total gulls	19,337	17,518	40,987	23,970	38,567	32,074	15,395
Sandwich Tern <i>Sterna sandvicensis</i>	452	18					1
Common Tern <i>Sterna hirundo</i>	11						
Black Tern <i>Chilodonia niger</i>	3	1					
Total gulls	466	19	0	0	0	0	1
Kingfisher <i>Alcedo atthis</i>	11	15	16	18	15	5	8
Total waterbirds	90,202	173,002	380,057	330,277	466,695	302,925	135,049

Table 2. Population trends of selected waterbird species in each year 1994 - 2001 inclusive, showing the number of sites and months (first initial) upon which each trend was based.

Species	n	Months	1994	1995	1996	1997	1998	1999	2000	2001	% change (indices)
Little Grebe	59	SO	82	122	110	83	112	96	96	100	+0.1
Great Crested Grebe	26	NDJFM	87	98	110	85	104	99	129	100	+2.7
Cormorant	40	S	105	137	143	128	165	115	142	100	-0.7
Grey Heron	49	S	181	145	136	109	98	100	107	100	-7.7
Mute Swan	70	O	77	84	76	92	107	85	104	100	+4.1
Shelduck	48	J	96	111	144	96	108	113	100	100	-1.0
Wigeon	133	J	188	202	153	136	139	140	145	100	-7.3
Gadwall	26	DJ	46	66	92	96	166	69	92	100	+8.2
Teal	138	J	104	121	106	111	133	137	123	100	+0.8
Mallard	81	J	120	118	139	114	113	129	113	100	-2.0
Pintail	27	DJ	306	283	323	152	283	175	199	100	-12.1
Shoveler	45	J	177	179	187	152	153	144	229	100	-4.2
Pochard	91	NDJ	149	123	118	67	83	98	109	100	-4.3
Tufted Duck	152	NDJFM	91	136	121	75	94	87	83	100	-3
Red-breasted Merganser	53	DJ	95	137	126	136	115	118	110	100	-1.3
Coot	103	NDJF	178	214	142	64	134	109	142	100	-7.1
Oystercatcher	86	NDJF	74	75	92	80	93	92	99	100	+4.4
Ringed Plover	55	NDJF	86	105	96	80	110	82	97	100	+0.7
Grey Plover	44	NDJF	103	104	110	104	85	91	88	100	-2.1
Knot	28	NDJF	165	129	183	131	143	134	135	100	-4.8
Dunlin	76	NDJF	125	141	137	101	111	109	107	100	-4.1
Sanderling	30	NDJF	120	75	91	105	100	95	97	100	+0.1
Curlew	165	NDJF	167	116	119	131	140	117	136	100	-3.2
Black-tailed Godwit	37	NDJF	132	63	79	76	100	100	120	100	+2.7
Bar-tailed Godwit	39	NDJF	64	87	116	78	102	99	104	100	+4.6
Redshank	97	NDJF	89	98	87	88	105	98	116	100	+2.6
Greenshank	60	NDJF	83	99	89	120	134	109	125	100	+3.9
Turnstone	54	NDJF	142	152	129	111	152	130	129	100	-3.4

Table 3. Concentrations of waterfowl counted in each year, 1994/95 - 1998-99 which attained threshold levels for international and interim all-Ireland importance levels. The most recent threshold values are used. Asterisks illustrate incomplete counts.

	No. of internationally important concentrations					Additional concentrations of all-Ireland importance					
	97-98	98-99	99-00	00-01	01-02	97-98	98-99	99-00	00-01	01-02	
Great Northern Diver	3	3	4	2	3						
Little Grebe		No threshold set					12	16	15	8	15
Great Crested Grebe	0	0	0	0	0	9	13	13	9	11	
Cormorant	0	0	0	0	0	13	15	16	11	10	
Grey Heron	0	0	0	0	0	0	0	0	2	1	
Mute Swan	0	0	0	0	0	14	19	23	13	14	
Bewick's Swan	2	0	2	0	1	0	1	7	1	1	
Whooper Swan	7	11	11	8	13	4	14	17	5	7	
Greenland White-fronted Goose	7	7	5	3	4	2	2	4	8	2	
Greylag Goose	1	4	4	2	2	10	9	9	10	9	
Barnacle Goose	2	5	4	2	1	3	4	4	0	4	
Light-bellied Brent Goose	19	22	26	22	25	International & national thresholds are equal					
Shelduck	0	0	0	0	0	16	19	19	11	10	
Wigeon	0	0	0	0	0	20	21	23	12	16	
Gadwall	0	1	0	0	0	9	6	10	5	14	
Teal	0	0	0	0	0	25	26	26	21	19	
Mallard	0	0	0	0	0	7	10	13	8	4	
Pintail	0	0	0	0	0	15	17	11	6	9	
Shoveler	0	0	0	2	0	23	23	17	14	18	
Pochard	1	1	1	1	1	6	9	4	0	7	
Tufted Duck	1	0	0	0	0	8	9	14	4	16	
Scaup	0	0	0	0	0	4	6	7	5	4	
Eider	0	0	0	0	0	1	1	0	0	1	
Long-tailed Duck	0	0	0	0	0	0	2	1	2	0	
Common Scoter	0	0	0	0	0	7	9	9	6	5	
Goldeneye	0	0	0	0	0	8	7	8	4	9	
Red-breasted Merganser	0	0	0	0	0	17	18	19	10	13	
Coot	0	1	0	1	0	11	8	9	3	6	
Oystercatcher	0	0	1	0	0	18	17	17	12	11	
Ringed Plover	1	2	0	3	1	22	23	27	16	23	
Golden Plover	0	0	0	0	0	32	36	36	24	34	
Grey Plover	1	0	0	0	0	21	20	21	12	17	
Lapwing	0	0	1	0	0	25	23	20	15	17	
Knot	2	2	2	2	2	8	10	11	8	8	
Sanderling	0	0	0	0	0	15	17	19	14	20	
Purple Sandpiper	0	0	0	0	0	4	5	6	2	2	
Dunlin	1	0	1	0	0	16	21	18	16	16	
Black-tailed Godwit	8	14	8	11	10	21	18	16	10	17	
Bar-tailed Godwit	3	4	4	2	2	14	14	14	13	14	
Curlew	1	0	0	0	0	9	13	12	10	6	
Redshank	4	5	3	4	2	16	14	16	17	16	
Greenshank	0	0	0	0	0	14	15	12	10	16	
Turnstone	0	0	0	0	0	13	17	15	8	8	
Total	64	82	77	65	67	492	547	558	365	450	

Principal sites

A total of 48 internationally important and 98 nationally important sites was identified over the five-season period up to and including 2001/02. Total waterfowl numbers increased at 30%, declined at 37%, and were stable at 9%, of these sites. Counts for the remaining 40 sites were incomplete in 2001/02, and thus no conclusion was drawn.

Dundalk Bay, the Shannon and Fergus Estuary and Wexford Harbour and Slobbs were shown to support the greatest numbers of waterfowl, and along with a further 10 sites supported in excess of 20,000 waterfowl (Table 4), automatically qualifying them as internationally important under the Ramsar Convention. All of these

sites also supported 1% of the flyway population of at least one species. An additional 36 internationally important sites supported in excess of 1% of the flyway population of a particular waterfowl flyway population (Table 4). Of the most important sites, the largest changes overall included declines at Cork Harbour and the Tralee Bay complex, and increases at Lough Corrib, Dublin Bay and the Boyne Estuary. However, numbers recorded at Ballymacoda were particularly low in 2001/02 alone, and this was largely due to declines in high density species such as Golden Plover, Lapwing and Dunlin.

There were 98 sites that regularly supported nationally important concentrations of at least one species of wintering waterfowl. Of these, the 58 sites that supported in excess of 1,000 waterfowl are listed in Table 4.

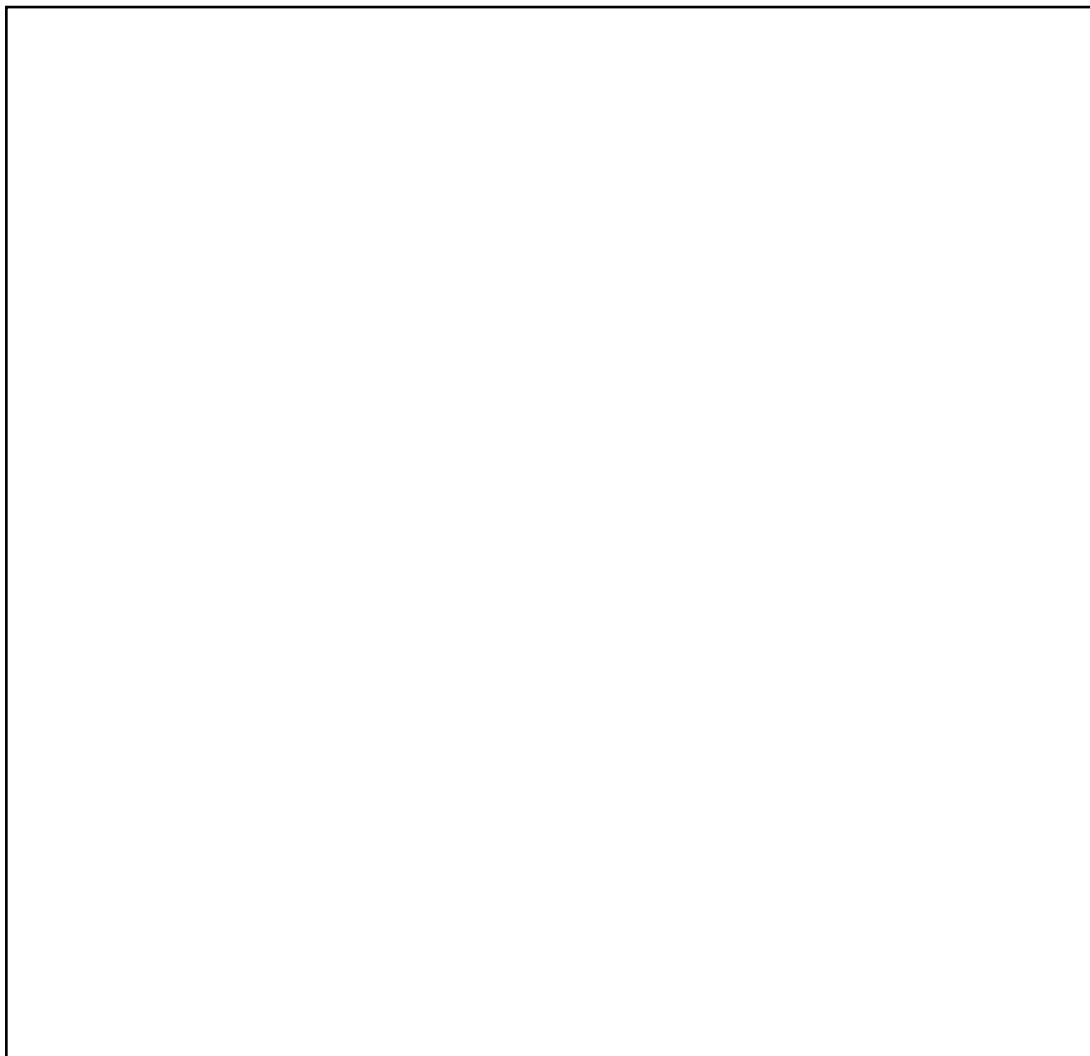


Table 4. Total numbers of waterbirds at principal wetlands counted by I-WeBS, 1997/98 - 2001/02. Totals are derived from summed annual maxima of each species across all months Sep - Mar inclusive in each year. Only sites holding 10,000 or more waterbirds and those holding internationally important concentrations of one or more species are shown. Species codes are given below, with those shown in lower- and upper-case indicating occurrence in nationally and internationally important numbers respectively. Asterisks illustrate incomplete counts.

ND	Great Northern Diver	GA	Gadwall	RP	Ringed Plover
LG	Little Grebe	T.	Teal	GP	Golden Plover
GG	Great Crested Grebe	MA	Mallard	GV	Grey Plover
CA	Cormorant	PT	Pintail	L.	Lapwing
H.	Grey Heron	SV	Shoveler	KN	Knot
MS	Mute Swan	PO	Pochard	SS	Sanderling
BS	Bewick's Swan	TU	Tufted Duck	PS	Purple Sandpiper
WS	Whooper Swan	SP	Scaup	DN	Dunlin
NW	Greenland White-fronted Goose	LN	Long-tailed Duck	BW	Black-tailed Godwit
GJ	Greylag Goose	CX	Common Scoter	BA	Bar-tailed Godwit
BY	Barnacle Goose	GN	Goldeneye	CU	Curlew
PB	Light-bellied Brent Goose	RM	Red-breasted Merganser	RK	Redshank
SU	Shelduck	CO	Coot	GK	Greenshank
WN	Wigeon	OC	Oystercatcher	TT	Turnstone

Site	1997/98	1998/99	1999/00	2000/01	2001/02	Mean	Species
>20,000 waterbirds							
Dundalk Bay	50,145	46,682	66,903	42,832	45,557	50,424	gg, ca, gj, PB, su, t., ma, pt, rm, OC, rp, gp, gv, l., KN, dn, BW, BA, cu, RK
Shannon & Fergus Estuary	64,703	54,973	44,719	44,784	38,401	49,516	gg, ca, ms, PB, su, wn, ga, t., pt, sv, sp, rp, gp, gv, l., kn, ss, dn, BW, cu, RK, gk, tt
Wexford Harbour & Slobs	47,713	41,583	32,716*	24,515*	32,835*	44,648	lg, gg, ca, ms, BS, ws, NW, PB, su, wn, ga, t., ma, pt, sp, gn, rm, oc, gp, gv, l., ss, dn, BW, BA, cu, rk
Lough Corrib	36,747	46,233	34,590	35,158	43,386	39,223	s, ga, sv, PO, tu, co, gp, l.
Little Brosna Callows	24,334	33,681	38,222	27,380	24,451	29,614	NW, wn, t., pt, sv, gp, l., BW
Cork Harbour	31,305	31,442	30,339	28,686*	20,375	28,378	lg, gg, ca, su, wn, t., ma, pt, sv, rm, oc, gp, gv, l., dn, BW, cu, RK, gk, tt
Dublin Bay	27,389	27,942	29,357	26,446	30,334	28,294	gg, PB, su, t., pt, sv, rm, oc, rp, gp, gv, kn, ss, dn, bw, BA, cu, RK, tt
Tralee Bay, Lough Gill & Akeragh Lough	21,779	42,416	31,157	25,700	19,194	28,049	ms, ws, by, PB, su, wn, ga, t., ma, pt, sv, po, sp, cx, oc, rp, gp, gv, l., ss, dn, bw, ba, cu, rk, gk, tt
Lough Swilly	26,172	25,995	28,513	27,820	28,864	27,473	lg, gg, ms, WS, NW, GJ, PB, su, wn, t., ma, sv, gn, rm, co, oc, kn, dn, cu, RK, gk
Shannon Callows	-	21,965	31,835	-	26,816	26,872	ms, WS, wn, gp, l., bw

Ballymacoda	23,714	26,688	26,682	26,710	18,149	24,389	su, t., rp, gp, gv, l., kn, ss, dn, BW, ba, cu, rk, tt, LB
Tacumshin Lake	17,245	35,998	12,683	-	1,423*	21,975	lg, ms, bs, WS, gj, wn, ga, t., pt, sv, po, tu, co, gp, gv, l., bw
Boyne Estuary	21,331	23,648	12,224	18,053	29,996	21,050	ca, PB, su, oc, gp, gv, l., kn, ss, bw, rk, tt

Other internationally important sites

Dungarvan Harbour	21,181	17,476	15,349	-	21,038	18,761	gg, PB, su, rm, oc, gp, gv, l., kn, dn, BW, ba, rk, tt
Inner Galway Bay	17,418	10,869	19,923	15,364	21,460	17,007	ND, lg, ca, h., ms, PB, su, wn, t., sv, sp, rm, rp, gp, gv, l., dn, ba, rk, gk, tt
Rogerstown Estuary	15,302	11,018	11,947	23,861	21,409	16,707	gj, PB, su, ga, sv, oc, rp, gv, l., kn, ss, dn, bw, rk, gk, tt
Lough Ree	24,884	13,363	9,651	22,020	8,476	15,679	lg, ms, WS, wn, t., ma, pt, sv, tu, gn, co, gp, l.
Castlemaine Harbour & Rossbehy	19,107	17,432	8,710	10,998	12,481	13,746	PB, wn, ma, pt, sp, cx, rm, rp, ss, ba, rk, gk
Broadmeadow (Malahide) Estuary	10,849	14,126	9,394	11,461	14,846	12,135	gg, PB, su, pt, gn, rm, oc, gv, kn, dn, bw, ba, rk, gk, tt
Killala Bay	7,323	11,861	15,223	8,858	11,538	10,961	PB, rm, rp, gp, gv, l., kn, ss, dn, ba, rk, gk
Bannow Bay	8,684	18,729	13,086	-	1,669	10,542	PB, su, pt, oc, gv, l., kn, dn, bw, ba, rk
Tramore Back Strand & Bay	9,352	8,693	11,246	-	6,644	8,984	gj, PB, gp, gv, dn, bw, ba
The Mullet, Broadhaven Blacksod Bays	6003*	5207*	8,644	9,225	8,154	8,674	BY, PB, cx, rm, rp, gv, ss, & ps, dn, ba, tt
Baldoyle Bay	7,374	6,592	7,859	5,751	8,891	7,293	PB, su, pt, rp, gp, gv, bw, ba, rk
North Central Galway Lakes	13,256	6,488	3,494	9,323	3,709	7,254	WS, wn, gp
Clonakilty Bay	6,513	8,294	-	7,201	4,768	6,694	su, BW, rk, gk
Cashen River & Estuary	-	3,677	6,722	-	9,591	6,663	WS, gp, l.
Ballysadare Bay	-	6,091	7,517	5,940	-	6,516	PB, rm, rp, dn, ba, rk, gk
North Wicklow Coastal Marshes	7,045	5,726	5,103	5,633	5,407	5,783	lg, gj, PB, wn, t.
Corofin Wetlands	5,348	9,171	4,841	3,508	2,117	4,997	lg, ms, wn, ga, t., BW
Sligo Harbour	258*	6,360	3,804	4,723	-	4,962	PB, rp, ss, rk, gk
Lough Iron	7,118	6,608	4,948	-	325	4,750	NW, wn, t., sv, gp
Lough Oughter Complex	4,182	4,216	4,218	3,367	3,256	3,848	gg, ms, WS, tu, gn
River Foyle	2,130	3,789	4,498	3,160	55*	3,394	ca, WS, gj
Donegal Bay	1,098	4,747	4,056	3,161	-	3,266	ND, nw, PB, cx, rm, rp
Blackwater Callows	3,609	2,922	2,783	3,709	2,654	3,135	WS, wn, t., bw
Hicks Tower, Robswall	-	1,183	2,742	2,239	5,043	2,802	PB, su, oc, gv, kn
Skerries Islands	2,455	3,087	2,965	2,102	2,503	2,622	ca, PB, ps, tt
Drumcliff Bay Estuary	1,537	3,379	5,440	1,838	137	2,466	BY, ln, rm, rp, ss, ba
Stabannan-Braganstown	1,333	2,444	3,398	4,190	362	2,345	GJ

Trawbreaga Bay	2,309	2,620	2,691	-	991	2,153	BY, PB, rp
Coole Lough - Newtown Turlough	650*	2,456	791	2,552	1,894	1,923	WS
Seagrang Park	1,006	867	1,668	1,590	1,329	1,292	PB, bw
Dunfanaghy New Lake	415	1,853	1,290	874	1,002	1,087	nw, BY
Glen Lough	464	724	1,088	-	10	572	WS
Oilean MacDara	536	-	-	-	-	536	BY
Birmore Island	-	-	456	-	-	456	BY
River Blackwater	182	-	-	-	-	182	WS
Nationally important sites							
The Cull & Killag	15,869	17,293	15,137	-	76*	16,100	bs, su, rm, rp, gp, gv, l., bw, ba
Courtmacsherry Bay, Broadstrand Bay & Dunworley	11,703	16,069	14,459	10,135	23,472	15,168	su, t., rm, oc, gp, dn, bw, cu, rk, gk
Rahasane Turlough	20,894	4,827	15,839	14,114	12,185	13,572	nw, wn, ga, gp, l., bw, ba
Southern Roscommon Lakes	220*	5,839	20,438	14,196	-	13,491	t., pt, sv, gp, l.
Blackwater Estuary	12,976	14,907	7,659	11,286	7,979	10,961	gp, l., dn, bw, ba, cu, rk, gk
Cahore Marshes	13,837	13,090	4,863	10,682	11,929	10,880	bs, nw, wn, t., sv, gp, l., bw
Carlingford Lough	8,729	9,172	9,955	3,565*	-	9,285	gg,ca,PB,sp,ln
Barrow Estuary	4,643	10,932	8,726	-	-	8,100	gp, l., dn, bw
Nanny Estuary & shore	12,136	7,052	6,002	4,974	9,867	8,006	cx, oc, rp, gp, kn, ss
Inishcarra Reservoirs	4,701	5,676	6,574	11,556	9,982	7,698	ms, gj, t., gp
River Suck	-	-	4,777	-	9,836	7,307	wn, gp, l.
Ballycotton Shanagarry	8,125	7,058	6,121	5,904	7,064	6,854	t., rp, gv, ss, bw, tt
Lough Derravaragh	8,450	6,449	7,356	-	3,107	6,341	lg, ms, po, tu, co
River Maigue	-	-	1,276	-	8,735	5,006	ga, gp, dn
Delvin River - Hampton Cove	4,717	6,459	5,635	2,039	4,986	4,767	ca, gp
Lough Ennell	3,761	5,271	1,636	-	5,375	4,011	lg, ms, po, tu, co
Lower Blackwater River	4,045	5,886	4,475	3,191	2,149	3,949	ca, bw
Boora Lakes - Back Lakes Finnamoses	4,454	2,959	2,972	4,715	-	3,775	lg, gp
Rosscarbery	3,953	3,890	3,227	3,738	3,798	3,721	gp, bw
Ballyallia Lake	4,958	7,288	46	5,539	768	3,720	wn, ga, t., pt, sv, co, bw
Lough Derg (Shannon)	-	4,699	5,373	542	3,958	3,643	ms, tu, gn
River Suir Lower Kells	4,914	5,202	4,055	708	3,156	3,607	gj, gp
	-	3,170	3,988	-	-	3,579	ws, wn, gv, bw
Mid-Clare Coast	3,024	5,343	5,304	-	554	3,556	by, rp, gp, ss, ps, dn, tt
Dunany Point - Clogher Head	3,884	846	6,683	-	2,737	3,538	rm, gp, kn, ss
Kildare Curragh	3,486	-	-	-	-	3,486	gp
Charleville Lagoons	1,584	1,608	3,124	3,359	6,570	3,249	sv
Annaghmore Lakes	3,968	4,819	3,932	1,613	1,701	3,207	t., sv
Rostaff Lake	3,091	3,636	3,888	2,938	2,133	3,137	sv
Clew Bay	3,033	1,196	1,893	4,279	4,752	3,031	by, rm, rp
Bandon Estuary	-	2,901	-	-	-	2,901	su, bw
Shrulle Turlough	2,896	-	-	-	-	2,896	gp

Ballyhaunis Lakes	2,067	3,026	2,876	3,154	3,003	2,825	ms, ws
Lough Sheelin	2,399	2,441	1,799	2,240	5,072	2,790	lg, gg, ca, po, tu, gn
Lough Owel	1,484	1,481	2,378	-	5,183	2,632	sv, po, co
Lough Rea	2,060	2,221	2,957	2,526	3,291	2,611	sv, co
Castleplunket Turloughs	2,059	2,581	2,997	2,518	-	2,539	ws, t.
Boyne Estuary - Skerries	-	-	-	2,508	-	2,508	cx
Kilcolman Marsh	4,675	2,614	1,254	2,782	1,199	2,505	gj, sv
Gorteen Lake	-	4,942	2,838	1,073	562	2,354	gp
Fortwilliam Turlough	1,510	1,747	3,632	3,299	1,393	2,316	gp
Cabragh Wetlands	3,375	2,145	1,993	1,883	1,931	2,265	t., sv
Lough Gur	2,762	2,004	2,813	2,425	1,249	2,251	ga, sv
Lady's Island Lake	1,307	2,828	5,444	715	817	2,222	ws, ga, po, sp, bw
Carrownacon Lakes	-	-	-	2,207	-	2,207	gp
South Mayo Coast	-	756	3,615	2,316	1,882	2,142	cx, rp, ss
Lough Kinale & Derragh Lough	4,224	1,170	596	-	1,369	1,840	ms, po
Glenamaddy Turlough	-	-	-	-	1,651	1,651	ws
Lough Gowna	603	2,505	2,821	1,464	664	1,611	gg, pt
River Slaney	996	1,611	2,212	-	-	1,606	ms, t.
Poulaphouca Reservoir	1,179	1,545	1,390	1,525	2,348	1,597	gj
Ballyness Bay	1,737	1,652	1,832	1,202	1,459	1,576	rp, ss
Lough Gara	-	-	-	1,201	1,653	1,427	WS
Skerries Coast	1,249	1,992	1,302	817	1,718	1,416	gv, ss, ps, tt
Smerwick Harbour	-	1,269	1,723	1,077	1,346	1,354	rp
Blackwater Railway Lake	2,307	2,204	344	1,259	559	1,335	ws, t.
Lough Carra	894	-	586	1,774	1,244	1,125	ga
Stick Estuary (Oysterhaven)	1,508	1,526	555	553	1,194	1,067	bw

Discussion

Relatively high coverage was achieved during the 2001/02 season, and the majority of sites were covered at least once. Lack of coverage of a few of the more important waterfowl sites such as Lough Corrib, the Shannon and Fergus Estuary and the Shannon and Brosna Callows in January meant that totals of some species such as Tufted Duck, Pochard, Oystercatcher and Knot, were lower, and peaked in other months. This serves to highlight the importance of a coordinated count in January. However, in practice, this is not always possible, particularly as counts of these large sites requires good visibility and usually greater resources and time.

Nevertheless, total numbers were slightly higher than in 2000/01 (Colhoun 2002), largely due to an increase in waders, and despite a slight decline in wildfowl totals. However, peak counts remain low when compared with the first 5-season mean (1994/95 – 1998/99).

All sites from the Republic of Ireland were included in this analysis. Inclusion of data from Northern Ireland sites would greatly improve any conclusions based on the results of the trend analyses. Declines in many species have been identified, particularly wildfowl. Wader populations appear to be faring slightly better, though there are many inconsistencies among species of similar habits. For instance, typical estuarine feeders of both mud and sandflats such as Oystercatcher, Black-tailed Godwit, Bar-tailed Godwit Greenshank and Redshank increased, contrasting with declines in Grey Plover, Knot, Dunlin and Curlew. It is therefore difficult to provide an immediate explanation for these trends using I-WeBS data alone. It is likely that additional factors are contributing significantly towards these trends, particularly those influencing success and productivity during the breeding season. However, it is also possible that the migration routes of some of these species may have been altered due to other extrinsic factors such as global warming. Some species may be short-stopping in Britain

or mainland Europe due to milder conditions there (Austin et al 2000, Rehfish et al 2003). It is therefore important that we continue to monitor their populations in Ireland, and to collaborate with other countries in their respective flyways so that we can detect any true declines in these populations. The International Waterfowl Censuses in January will provide the whole flyway population context for interpreting changes in Ireland.

The number and ranks of internationally and nationally important sites remains relatively consistent with recent years (Colhoun 2002, 2001a & 2001b). The importance of wetland sites for wintering waterbirds in Ireland has undergone considerable change over the past 30 years. Since the earlier surveys (Hutchinson 1979, Sheppard 1993), many sites have been lost or diminished due to development or, in some cases, due to natural causes. However, many new sites have also become increasingly important. Since the mid-1990s, a total of 109 Special Protection Areas (SPAs) have been fully designated in Ireland under the European Union Birds Directive. Of these, 75 are regularly used by significant numbers of wintering waterfowl. Further, many more new SPAs have been proposed for designation in recent years. It is hoped the strict regulations associated with SPA designation in particular, and also with other designations such as EU Special Areas of Conservation (under the Habitats Directive) and Natural Heritage Areas (national designation) will safeguard these important wintering grounds from destruction, a first step in working towards achieving improved conservation status of wintering waterbird populations in Ireland.

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